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EXAMINER

RIMELL, SAMUEL G

ART UNIT	PAPER NUMBER
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2175

DATE MAILED: 06/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/810,973

Applicant(s)

BESTGEN ET AL.

Examiner

Sam Rimell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3-38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

  
**SAM RIMELL**  
**PRIMARY EXAMINER**

## Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_.

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The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 and 3-38 are rejected under 35 U.S.C. 102(e) as being anticipated by Acharya et al. (U.S. Patent 6,477,534).

Claim 1: FIG. 10A illustrates a method step of receiving a query. FIG. 10C illustrates the method step of re-writing the query of FIG. 10A, based on an evaluation of execution plans. The action of re-writing a query is query optimization.

The evaluation of execution plans is shown in table 2 and is illustrated as an evaluation the query operators AVG and SUM as shown in Table 2. (Examiner has numbered the three calculations in Table 2 as “1” “2” and “3” for clarity). Three execution plans are illustrated in table 2, numbered as “1”, “2” and “3” by the Examiner. Although the three execution plans shown in table 2 involve executing the operator AVG, they apply as well to the operator SUM used in the query of FIG. 10A (see bottom of Table 2).

Each execution plan in Table 2 involves calculation of cost. The cost in this case is the number of subsamples of data (referred to as “chunks”) that must be taken from the database to obtain certain desired levels of confidence for the query results (col. 15, lines 63-67). These are costs on the system resources in that they are a degree of system resources that must be used to process the operator SUM or AVG. The first execution plan involves no chunks, while the second and third plans involve certain specific numbers of chunks.

The cost (number of chunks) is associated with a numerical quantity (confidence P) in each calculation. The confidence P has four different characteristics, or vector dimensions. These four different characteristics are magnitude, variance, confidence, and penalty. For example, as seen in the first calculation, the magnitude is the highest value for P, which is 0.961. The variance is the range of values,  $0 \rightarrow 0.961$  for that plan. The confidence is any given value P within the range. The penalty is 0.961 since it is the maximum difference between the magnitude and the lowest value in the range (zero).

Table 2 and its associated explanation at col. 18, lines 25-37 illustrate that the third execution plan, which uses a specific chunking technique is the most desirable of the plans, since it produces the highest confidence level P. Thus, as seen in FIG. 10C, the original query from FIG. 10A is altered to produce a new query in FIG. 10C that uses the desirable “chunking technique” described in the second and third execution plans of Table 2. Each technique is associated with the above discussed vector quantities.

Claim 3: As described with respect to claim 4, evaluation of the query operators will involve a comparison of at least two dimensions (characteristics) of the confidence value P. For example, in the first calculation in table 2, the confidence value P is compared to the variance (the range of values for P).

Claim 4-5: The confidence value of P has all four of the claimed characteristics or dimensions. These are magnitude, variance, confidence and penalty. The explanation associated with claim 1 provides more detail on how the confidence values in table 2 have each of these characteristics.

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Claim 6: Each of the three calculations in table 2 involve an evaluation of the vector quantity P. Thus, lacking any further detail on the nature of the vector quantity, table 2 appears to illustrate three different vector quantities (three individual evaluations of P).

Claim 7: The vector quantity P has four different characteristics, which are magnitude, variance, confidence and penalty.

Claim 8: Table 2 illustrates three execution plans.

Claim 9: The “acceptance criteria” in Acharya et al. is having the highest desired level of confidence. Thus, the third execution plan in Table 2 meets an acceptance criteria.

Claim 10: The objective in Acharya et al. is to pursue the strategy that achieves the highest confidence value (col. 5, lines 38-47). These are the execution plans in which the chunking technique is used to increase the confidence value P.

Claim 11: The confidence value P has four characteristics, including magnitude, variance confidence and penalty. The remarks for claim 1 outline how each of these characteristics are shown in Table 2.

Claim 12: See remarks for claim 5.

Claim 13: See remarks for claims 1. Note that each of the three calculations in table 2 involve an evaluation of the vector quantity P. Thus, lacking any further detail on the nature of the vector quantity, table 2 appears to illustrate three different vector quantities (three individual evaluations of P).

Claim 14: Table 3 describes each query plan as being associated with “upper bounds”. Col. 13, lines 16-35 further elaborate the calculation of these upper bounds, and state that they

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are proportional to selectivity. Thus, selectivity becomes another vector quantity having multiple characteristics, or dimensions.

Claim 15: See remarks for claim 6.

Claim 16: See remarks for claim 3.

Claim 17: See remarks for claim 4.

Claim 18: See remarks for claim 5.

Claim 19: Table 2 involves a consideration of three execution plans.

Claim 20: See remarks for claim 4.

Claim 21: See remarks for claim 5.

Claim 22: See remarks for claims 1 and 5.

Claim 23: See remarks for claim 3.

Claim 24: See remarks for claim 8.

Claim 25: See remarks for claim 9.

Claim 26: See remarks for claim 10.

Claim 27: See remarks for claim 1.

Claim 28: The signal bearing medium is the query optimization program that optimizes the query in FIG. 10A and changes it to the query in FIG. 10C. The program is schematically illustrated as "AQUA" in FIG. 9.

Claim 29: See remarks for claim 3.

Claim 30: See remarks for claim 4.

Claim 31: See remarks for claim 5.

Claim 32: See remarks for claim 6.

Claim 33: See remarks for claim 7.

Claim 34: See remarks for claim 8.

Claim 35: See remarks for claim 9.

Claim 36: See remarks for claim 10.

Claim 37: See remarks for claim 11.

Claim 38: See remarks for claim 12.

#### Remarks

Applicant's arguments have been considered.

Applicant first argues that Acharya has "nothing to do whatsoever" with query optimization, preparing execution plans, and calculating cost of an execution plan. Examiner fully disagrees with each of these assertions.

First, the reference to Acharya clearly discloses a query optimization function in its discussion of FIGS. 10A and 10C. FIG. 10A presents an original query which is subsequently rewritten using the "chunking" techniques referenced in Table 2. The result is an optimized query shown in FIG. 10C. Table 2 of Acharya et al. disclose 3 alternative execution techniques or plans for processing the aggregation operator AVG, but they equally apply to the aggregation operator SUM which is used in FIGS. 10A and 10C. Furthermore, Acharya et al. discloses the consideration of cost values, which are the number of "chunks" that must be taken from the database to obtain certain desired levels of confidence in the query results. Therefore, examiner maintains that Acharya et al. discloses query optimization, preparing of query plans, and calculation of cost on the system resources.

Applicant argues that Table 2 does not illustrate an evaluation of execution plans. Examiner maintains that this exactly what is illustrated in Table 2. The data of Table 2 is used to establish three alternative techniques for processing the query operator AVG, but the same techniques are applicable to the operator SUM which is optimized in FIG. 10C. Each of the three alternative techniques are different plans for processing the query operators AVG or SUM that appear in the queries of FIGS. 10A and 10C.

Applicant argues that Acharya et al. involves no consideration of “cost”. Examiner maintains that the “chunks” described in Table 2 correspond to cost. The chunks themselves are subsamples of data (col. 15, lines 63-67). By applicant’s definition, cost refers to the resource requirements that are made on the computer system to process data (page 3, lines 10-11 of specification). Since subsamples of data (chunks) are in fact resources within the computer system, the usage of a certain number of chunks correlates to a usage of a certain amount of system resources, and hence cost.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,



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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication should be directed to Sam Rimell at telephone number (703) 306-5626.

A handwritten signature in black ink, appearing to read 'S. Rimell', is positioned above the printed name.

Sam Rimell  
Primary Examiner  
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